

1 ABSTRACT OF THE INVENTION

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3 Method and Apparatus for Separating Emulsified Water from Fuel

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5 The invention discloses an apparatus for filtration of water from hydrocarbons  
6 comprised of a fresh-feed inlet, a first dead end filter, having a filter medium that is  
7 hydrophobic, a second cross-flow filter, having a membrane that is hydrophobic, a  
8 common housing to contain both the first and second filters, a system for the  
9 recirculation of the retentate, a chamber for water settling, and an outlet for clean fuel  
10 permeate. This invention takes advantage of the properties of the functional groups of  
11 a surfactant, by using the surfactant to allow a hydrophobic medium to attract water,  
12 attach the water molecules to the hydrophobic medium, and then allow for  
13 agglomeration of the water molecules, which finally become large enough to detach  
14 and be swept away by the cross-flow. The hydrocarbon may then pass through the  
15 second membrane filter uncontaminated by water and be used as clean fuel. This  
16 invention can thus be used to remove high concentrations of water, up to 5%, in  
17 hydrocarbons, while allowing a high flow rate by preventing blockage of the final filter  
18 by water.